

Worcester Polytechnic Institute

How to Improve the Business Model for a Cosmetic Start-up Company

An Interactive Qualifying Project Proposal
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Abstract

Yunxi Biotechnology, a cosmetics company in Hangzhou China, sponsored this WPI inter qualifying project. The company uses animal-derived stem cells in their cosmetics to treat a variety of skin conditions. There were three main goals the sponsor wanted to be achieved through the seven-week project: (1) Investigate the potential customer responses both in China and in the US to stem cell beauty products; (2) research the current state of stem cell technology in the US today; and (3) assess and report which government regulations. Yunxi Biotechnology would need to be aware of and adhere to if the company were to expand into the US. Lastly, based on the study on those three questions a business strategy can be proposed. Through research and survey data, we found that the best approach for expanding to the US is to avoid medical language while marketing the product, in order to bypass U.S. Food and Drug Administration regulations, while setting the company up to be acquired by a larger cosmetics company.

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Executive summary

Purpose of report

Yunxi Biotechnology is a startup company in Hangzhou, China. They specialize in stem cell products to help skin blemishes, flaws, and diseases. In order to do this, they have seven products, assigned with number zero through six. Each has its own ability. Our group was assigned the job of investigating the potential customer reaction of China and the United States (US_[SJ1]) to stem cell cosmetics, how to break into each market, finding out the current state of stem cell research in the United States, and assessing the regulations in the United States of stem cell products. We plan to reach these goals by conducting research online, interviewing experts and surveying the general population, and analyzing the results of the collected information.^[hp2]

Methods

We collected data from the general population through the use of surveys. The WPI team sent out a survey through an Amazon service called Mturk. Mturk allowed us to receive an large number of responses by paying each responder fifty cents. We then analyzed all our data by using Qualtrics. This allowed the team to draw conclusions and create figures for the report about the United States population's opinion on topics related to stem cells and stem cell research. The Hangzhou Dianzi University (HDU_[SJ3]) team also sent out a survey through Wenjuanxing and analyzed_[SJ4] it using this

program as well. The HDU team sent out their survey for a similar reason to the United States survey except they used it to analyze the Chinese population's response to stem cells and stem cell research^[hp5]. The main interview we conducted was with cosmetics company CEO Yael Schwartz who gave us great insight into the behind-the-scenes process of running a cosmetic company. Also, we built on our knowledge by conducting online secondary research through peer reviewed articles and research papers. This gave us information on different forms of business strategies and the laws surrounding stem cells in the United States.

Findings

Our findings could be broken down into three main parts: The Food and Drug Administration restrictions and regulations, Current Assessment of the Stem Cell Market and Strengths, Weaknesses, Opportunities, and Threats (SWOT^[SJ6]) Analysis, and long-term business models.

To start^[hp7] ^[SJ8], the United States Food and Drug Administration (FDA) has guidelines for stem cell research. The FDA states that “the only stem cell products that are FDA-approved for use in the United States consist of blood-forming stem cells also known as hematopoietic progenitor cells) that are derived from umbilical cord blood. These products are approved for use in patients with disorders that affect the production of blood (i.e., the “hematopoietic” system) but they are not approved for other uses”

(FDA)^[S.9]. Therefore, if a product is made with stem cells, the product is required to proceed through a clinical trial under FDA oversight.

However, the technical term for the products that Yunxi biotechnology produces is cosmetic because it is applied to change the appearance of the user. Cosmetics do not need to do the already mentioned clinical trial so long as they are marketed as a cosmetic and there are no claims that the cosmetic cures any diseases. Right now, the Hangzhou Yunxi Biotechnology Company is describing their lotion as “intending to affect the structure or function of the body, or for a therapeutic purpose, such as treating or preventing disease” (U.S. Food and Drugs). Therefore, this product also falls under the category of a drug and must follow the FDA guidelines for a drug. Also, with their products in their current state, Yunxi Biotechnology will have to also follow the rules of stem cell products. The FDA has provided lists of ingredients in drugs that are considered safe and ingredients that can be harmful. For a drug to be approved by the FDA, the following steps must be taken: FDA reviewers analyze target conditions and available treatments; assess benefits and risks from clinical data; and strategize for managing risks. Before the drugs can even cross international borders, there is a plethora of documentation that needs completion. Through the FDA, an investigational new drug application will need to be filled out in order to get authorization to administer a new drug for clinical trials. In addition, a reviewer from the FDA must be approved to verify the data of the clinical trials.

Next^[hp10] is our current assessment of the stem cell market and SWOT (strengths, weaknesses, opportunities, and threats) analysis. Throughout our research it became obvious that there is a large variety of stem cell products on the market. Many companies sell plant-derived stem cell products which may be more appealing to individuals who are worried about the ethical sourcing of their products. The companies in this industry which are not selling plant-derived stem cell cosmetics are offering human-derived stem cell products. We were not able to find any companies that offer animal-derived stem cell cosmetic products. Most companies that sell human-derived stem cell products focus on serums and aqueous solutions. There does not appear to be many creams or cleansers on the market. That being said, the stem cells they use and how they use them seems to vary significantly. Some companies use stem cell growth factors to condition their media; some use fibroblast conditioned media, and other companies use the client's own stem cells, acquired through liposuction to condition the media in their customizable products. There are hundreds of more ways that stem cells are used in medical field.

We ^[SJ11] were able to collect a significant amount of data from our analysis of the American market through surveys. We found that the majority of people have a three out of five level of knowledge of stem cells. The main concern of consumers is ethical concerns about how the stem cells are gotten and how the animals are treated to get their stem cells. We also found that less than one percent of people spend more than one hundred dollars on cosmetics. This is an issue because the products that Yunxi biotechnology sells are high-cost products. We also asked questions about advertising

and found that their target audience said ads and beauty salons are the best way to show them products. The majority of our audience says they primarily use Instagram, so It would be best to put ads there.

Finally,^[hp12] we examined long term business models. In our opinion, Hangzhou Yunxi Biotechnology Company's best long-term business strategy is to prepare themselves for acquisition from a United States' cosmetic corporation. When we interviewed the industry expert, Yael Schwartz, she agreed that in this market, acquisition is best for this company. An acquisition is when a larger company buys all or majority shares to gain control of a smaller company. This is good for the startup owners because they get their shares sold at a premium and are given the option to keep their jobs at a company with more revenue. It is also best for the products because they will have more money behind them for marketing, legal issues, and any more research. However, if acquisition is not the way Yunxi Biotechnology wants to go, it is still a good idea to do the pre-acquisition actions because they will increase trust and marketability in the United States of America.

Steps to prepare for acquisition for Yunxi include preparing products in a proper clean setting, ensuring the entire company from packaging to company size is as streamlined as possible, and getting an audience with dermatologist boards. Where and how you make the products narrows down to two main focus points: being made in a good manufacturing process (GMP) facility and ensuring that the base raw material is pure. A good manufacturing process facility is a factory that practices ethical business practices

in a safe environment and gets audited by the Food and Drug Administration. GMP^[hp13] will also help ensure base materials are pure. Another way to ensure it is pure is by producing these materials in house. There are also several streamlining actions that Yunxi biotechnology can do to be more attractive to buyers. The first is to have a set plan where money will go and to focus on marketing. Next, reduce small debts by adopting a pay now, not later motto because this will reduce chances of late fees and small interest rates. Then, stay on schedule because this would help everyone stay on track and show a face of unity to any possible acquiring corporations. After following these streamlining actions, Yunxi Biotechnology should try to receive approval from dermatology boards. Dermatology boards are important because they bring legitimacy to the company and products. The best way for Yunxi Biotechnology's products to get dermatology boards approval is to hire a United States based marketing team as they will have ins with boards to get the product presented. Normally, the board will have any product that gives them money.

Conclusion

Yunxi Biotechnology, a cosmetics start-up in Hangzhou China, requested that we recommend a business model and marketing strategies for the company to expand, based on research surrounding the company. More specifically, we were asked to answer three main questions. First, we set out to understand which government regulations a stem cell skin care company would need to adhere to if operating in the US. Second, we were asked to analyze the market reactions^[hp14] in the US and in

China to stem cell based cosmetics. Finally, we were to analyze^[hp15] the state of stem cell technology in the US as well as the ethics involved in this field.

Authorship

Kyle DeRoma, Seamus Sullivan, Maya Yaakov, and Isaac Tufts equally contributed to the research, writing, and findings of this IQP report. Since our team was unable to travel to Hangzhou, our HDU counterparts provided our team with data collected in China.

Initially, during our ID2050 class, Kyle DeRoma, Seamus Sullivan, Maya Yaakov, and Isaac Tufts conducted archival research on stem cells and business strategies. Kyle DeRoma and Maya Yaakov researched and discussed the definition and ethics in stem cells in the background section while Seamus Sullivan and Isaac Tufts discussed business strategies in the background section. Later on, Kyle DeRoma, Seamus Sullivan, Maya Yaakov, and Isaac Tufts each took a methodology found in the methodology section: Kyle DeRoma worked on the surveys section specifically for U.S. customers, Isaac Tufts added to the research section specifically looking at more business strategies, Seamus Sullivan wrote the focus group section discussing how to conduct focus groups in China, and Maya Yaakov worked on the interview section.

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1 Introduction

Hangzhou Yunxi Biotechnology is a company in Hangzhou, China, with a unique series of up-and-coming recombinant stem cell products. They include—but are not limited to—a cream that can heal burns and other scars, a cream that helps with wrinkle removal and pale spots, and a cream for moisturizing in autumn and winter. What differentiates their product from other cosmetic creams is the addition of recombinant stem cells, which are stem cells that are not from the patient and have completely different DNA than the patient. They provided some critical background information about their company: the number of employees that their company has, access to their customer groups to get information, how they currently market the product, and their urge to expand their business—especially to the United States (US).

With this information, we sought to address the following research question: How to develop the correct business model and research rollout in the United States for a cosmetic startup like Hangzhou Yunxi Biotechnology?

Our interactive qualifying project (IQP) team looked at how to create successful business models through different marketing and advertising strategies, investment opportunities, and regulatory environments. We researched businesses with related products and how they created their business models for their products. As a team, we also analyzed the ethics of stem cell research in China and more importantly the United States, specifically and to gauge knowledge and opinions of xxx. We collected data from the company's previous consumer groups and other industry professionals via

research, group questioning, and interviews. We also sent out surveys to Americans and Chinese to find out their opinions on stem cells and research their media habits to market to them. We also conducted research on the legality of stem cell products in the United States. In addition to conducting research we administered interviews with industry professionals to determine how to legally sell cosmetics in the United States. This data was used to plan a proper business model for Hangzhou Yunxi Biotechnology to help in expansion of their company to their fullest potential.

2 Background

In this section, the major ethical and social concerns behind stem cell products will be discussed along with common business plan strategies.

2.1 Ethical and Social Concerns of Stem Cell Products

Stem cell concerns and how they are used has been well established (van der Kooy 2000). The cell hierarchy ranges from one cell and differentiate into multiple, different cells. This hierarchy is called the germ line, and it starts from the stem cell which evolves into different cells. Thus, a stem cell is any cell that can self-renew and can differentiate into another cell.

Stem cells may include embryonic and blastocyst cells. Embryonic cells are cells taken from the embryo of a fertilized female. Blastocyst cells are cells that make up these embryonic stem cells. There are many potential untapped stem cell possibilities. Researchers are trying to tap into this remarkable potential, but they still have a long way to go (van der Kooy 2000). Using the knowledge of what stem cells actually are and how they can be possibly manipulated, we can create a business model that can educate the consumers about the types of stem cells that Hangzhou Yunxi Biotechnology uses and how their product will help consumers.

There are multiple schools of thought on the use of stem cells in the cosmetics field. One opinion is that stem cell cosmetic products are unfounded, misleading and potentially endangering customers. According to a research paper called

“Commercialization and Stem Cell Research: A Review of Emerging Issues”

(Burningham) products that are sold as “stem cell cosmetics” can simply be marketed with this phrasing to promote sales. There is some skepticism about any claims of proven benefit to the use of stem cells in cosmetics. Many times these products are marketed without research to back them up. In some cases calling them stem cells can be misleading because many times companies use plant stem cells which do not have the same benefits as associated with mammalian stem cells. Plant stem cells could lead to adverse reactions, endangering the consumer (Wang 2019).

According to Wang (2019), not only is the advertising of stem cell products concerning, but there are serious ethical dilemmas with using stem cells in general. The original ethical debates about stem cells mostly related to the use of embryonic stem cells and whether those were ethical to use. According to the United States Conference of Catholic Bishops the use of stem cells is against the ideology of the pro-life movement, a considerably large movement in the United States. The Catholic bishops’ logic is that it is illegal due to the appropriations rider known as the Dickey Amendment which bans the funding of research of embryonic stem cells which were collected in a way that human embryos are harmed or for use outside the womb. They also believe it is immoral because it breaks the Nuremberg law which states one can not do deadly harm to a member of the human species solely for the sake of potential benefit to others. It is also questionable if cosmetics are worth the use of stem cells due to the effort it takes to harvest them.

In contrast, a study published by *Biomedical Dermatology* (Kim et al., 2020), shows that stem cells in skin care can lead to overall skin improvement. This study analyzed the effect of stem cells on skin pigmentation, wrinkles, and moisture, on women aged 30-50 in South Korea. They found that all of these qualities improved with the treatment that contained stem cells. These stem cells were in fact human stem cells, not derived from plants like expressed above (Kim 2020).

In conclusion, while some claim that there is no evidence of the effectiveness of cosmetics in skincare, there are in fact studies that prove this wrong. There may be a limited number but this is a new and growing field. Even though this field also provides several ethical concerns to religion and women's health, the field of stem cells has extreme promise to help people heal their blemishes in the form of a cosmetic product.

2.2 Business Models and Planning

Reviewing possible business models and policies, as well as their benefits and detriments, has a strong impact on how a company performs as a startup. Knowing past failures of different startups, as well as reasons, and startups that experienced success, and what led to that success, can provide insight for a company's growth and success within their own field.

Jonson and Evans (2013) provide information about business models and processes used commonly among startups. Specifically, the two discuss Lockheed Martin and a Risk/Return framework used for early stage ideas. Two questions they ask

when looking at a new idea are “If it goes well, and the idea pans out, is it likely the business venture will be material to the business?” and what is the quick estimate of potential income (Johnson and Evans, 2013)?

These questions can be used in analyzing some of the early ideas of a startup, which can be useful when deciding specific ideas they may want to pursue early on, and where to focus their resources. In addition to the questions, there are three key components to consider when brainstorming possible ideas: desirability, feasibility, and viability (Brecht et al. 2021). The company needs to consider who will want the product, if this is something they can reasonably acquire, and if it is too costly to do. Thinking these through before following through with any idea can protect a company against many possible failures.

When looking at some fundamental ideas in business, one needs a strong definition and goal to prevent themselves from experiencing some possible failures. In our research we found that developing a strong management team is crucial in a startup. Additionally, value should not just be measured in monetary gain, but also need to view social and environmental impact, so that management should avoid “thin” mindsets that narrow possible options (Upward and Jones, 2016). This perspective guards a company against upper management making uninformed decisions that may have larger impacts than originally intended. While companies' main focus should be money, as they cannot function without it, they need to ensure they are considering a broader perspective before they make a decision, as money is not the only factor in their success.

Marketing is how a company promotes a good or service to their potential customer base. An effective marketing strategy is important for many reasons, the first being that it is the first way that the customer interacts with or sees the company. A portion of our project looks at firm marketing strategies for the US to determine what experiences are applicable to Yunxi Biotechnology Co.

One marketing strategy is to promote the product as a cosmeceutical (Nasto, 2007). A cosmeceutical is a cosmetic that is mixed with drug-like benefits. Marketing a product as a revolutionary science-based serum, can increase profit margins relative to marketing a simple cosmetic such as a foundation (Wang, Dong, Chen and Zheng, 2011). This plan is very applicable to this IQP sponsor because they are trying to develop into a high-end retailer for a discerning, upmarket clientele. For Yunxi, it is important that customers are repeat users because stem cell products are more effective when used in smaller doses over multiple sessions. Stem cells need time to change into the cells the body needs or the cells the body needs to replace (van der Kooy 2000).

Another key finding among United States cosmetic companies is the need to create a positive reputation. This reputation is important for cutting edge medical research due to the idea that new treatments are dangerous until proven otherwise; safety is a major concern in the cosmetic industry. This fear will drive sales down as people are afraid that they could be harmed. Fear of medical treatments has a snowballing effect that could destroy a company and its market. The only way to

counter this is to build corporate legitimacy by having official offices, proven trials, and positive reviews (X. Wang et al. 2011).

Another part of our project is to analyze the sponsor's development of their project from a professional point of view. Currently, we are analyzing the development of their marketing strategies. Looking at case studies of two leading cosmetic companies, Estee Lauder and L'Oreal, we can compare their initial development and seek to identify early patterns of success (Nasto, 2007). The current majority of sales of these big companies are online. This situation represents a major challenge to the sponsor given that they have a severely underdeveloped website that is information poor. We have yet to see if the Hangzhou Yunxi Biotechnology company has any branches, but one thing all these large companies started early on was rebranding certain branches of their company to make each branch appear to be their own company. This company organization plan promotes consumer choice and customizability in cosmetics. Also by giving many choices they can overwhelm the consumer causing them to panic buy products. These are some ways we can use our research to better our IQP assignment using our new knowledge of marketing strategies.

3 Methodology

Throughout the project we focused on three main objectives:

1. To provide Yunxi Biotechnology with an assessment of the state of stem cell technology in the United States today.
2. To provide Yunxi Biotechnology with an assessment of the laws and regulations, taking note of the ethical discussions, that may affect the company if they were to expand into the United States.
3. To provide Yunxi Biotechnology with an assessment of the market in the United States and China. This included consumer responses to the products, marketing strategies, as well as business strategies and models.

3.1 Assessment of the current state of stem cell technology in the United States

Secondary archival research was the primary method we used to analyze the state of stem cell technology, particularly in the cosmetics industry, in the US today. This research was conducted to provide Yunxi Biotechnology with an understanding of what sort of market they would be entering into if they were to expand into the US. In order to ensure the quality of the papers we were reading, we mostly conducted research through the WPI library. We used keywords such as “stem cell cosmetics”, “US stem cell”, “stem cell cosmetics in the US”, etc. Additionally, by conducting internet research we found other companies selling stem cell cosmetics. This allowed us to compile a table with potential competitors and the types of technology they are using.

3.2 Assessment of the laws and regulations

Online research was the main form of investigation we conducted into this topic. This gave us an understanding of which laws and regulations in the US the company must adhere to if they were to expand into the US market. A large portion of this research was conducted on the FDA's website.

Additionally an interview was conducted with a cosmetic company CEO, Yael Schwartz. This interview served as a method to learn about the regulations around cosmetics and what sort of marketing and business model fit within those limitations.

3.3 Market Assessment

We used a variety of methods to identify which business strategies would be effective for Hangzhou Yunxi Biotechnology.

3.3.1 Online Survey Questionnaires

Online surveys is another primary research method used in this project. Two types of surveys were made to target two different groups of people: consumer groups in the US. and consumer groups in China.

The qualitative and quantitative data we collected indicated how much the consumer groups know about the fundamentals of the product. It analyzed their understanding of stem cells and how the healing process works as a baseline. The surveys were used to gauge the market's reactions to products in both countries. In addition, the surveys allowed us to explore which demographics Yunxi Biotechnology

should be targeting and what would be effective marketing methods to use with these consumers. All of this information can be used to improve the company's business model.

The American surveys were created and analyzed using Qualtrics (see Appendix A). In order to reduce sampling bias, we used Amazon Mechanical Turk to distribute the surveys. This is a site that crowdsources tasks for a small fee. We were able to set parameters for the location of the survey takers. Each respondent was paid \$0.50 for completing the survey. The survey was distributed in two batches. The first was open for anyone in the US, while the second one was only for women in the US. We wanted to focus mostly on women, given that they are our primary consumer. Using Amazon Mechanical Turk may introduce a sampling bias. The only respondents are people willing to spend 5 minutes to only make \$0.50 and who work on Amazon Mechanical Turk, meaning that the sample might not truly represent the population of the US. With help from a marketing professor at WPI, Dr. Shaw, the survey was set up in an effort to extract as much information as possible from the surveyee. For this reason, we added all the demographic questions to the end of the survey so that the person taking it would already feel invested and not intruded upon. We also used many Likert scales throughout the survey to allow responders to remain neutral if they do not have an opinion. It also allows for easy data analysis. The questions were grouped into monetary questions, ethics questions, stem cell knowledge, and demographics.

Simultaneously, the HDU students distributed a survey using Wenjuanxing to potential consumers in China (see Appendices B and C). The data will be used the

same way as the American data, to collect information about the consumers and the market. The difference with this data is the sampling bias. The survey in China was only sent to people in the same circle as the HDU students, meaning that it's not a completely accurate representation of the population.

The quantitative data being collected was grouped into bar graphs to see the distribution and the mean level of satisfaction of the consumer groups. The qualitative data was statistically evaluated. Qualtrics auto-generated means and standard deviations for the responses to each question. We created a list of popular responses from most popular to least popular to provide us with information on how the consumers think.

The surveys were completely anonymous to allow respondents to reply freely and truthfully. The front page of the survey displayed a message saying that each response will be anonymous, ensuring privacy. This was in line with privacy and confidentiality requirements.

3.3.2 Interviews

The interview with Yael Schwartz, the President and CEO of Or-Genix Therapeutics, also provided information on the topic of which type of business models fit into the cosmetic industry, and more specifically the medical cosmetic industry.

In addition, the HDU students interviewed a couple of past consumers of the product to gain a better understanding of what inspired them to buy the product in the first place and what their reactions were to the product once they had it. This helped us find what we should focus on for future consumers.

3.3.3 Company analysis

One major part of our project was analyzing the development of the sponsor from a professional point of view. The method we used to accomplish this was a Strengths Weaknesses Opportunities Threats (SWOT) analysis. The HDU students worked in conjunction with us to create a comprehensive SWOT analysis to find the company's strengths and weaknesses that they should focus on while assessing their business models.

4 Findings

4.1 U.S. FDA Guidelines for the Hangzhou Yunxi Biotechnology Product

After conducting surveys on both the American and Chinese market, we discovered some interesting results. We found the Chinese market to be a bit more receptive of the product while the American market seemed more skeptical. Based on answers to the surveys, American consumers seemed to research products more, and be more likely to stay with their chosen product.

Based on the descriptions from the Federal Drug Administration, the stem cell cream that the Hangzhou Yunxi Biotechnology company produced falls under the FDA categories of a cosmetic and a drug.

The first thing that our group considered was the FDA guidelines surrounding stem cells. The FDA states that “the only stem cell products that are FDA-approved for use in the United States consist of blood-forming stem cells (also known as hematopoietic progenitor cells) that are derived from umbilical cord blood. These products are approved for use in patients with disorders that affect the production of blood (i.e., the “hematopoietic” system) but they are not approved for other uses” (U.S. Food and Drugs). Therefore, if a product is made with stem cells, the product is required to proceed through a clinical trial under FDA oversight. A company with a stem cell product cannot simply claim to cure a disease without hard evidence and trials to support its claims.

The product is considered a cosmetic, because it is a product that is intended to be “rubbed, poured, sprinkled, or sprayed on, introduced into, or otherwise applied to the human body...for cleansing, beautifying, promoting attractiveness, or altering the appearance” (U.S. Food and Drugs 2021). Therefore, cosmetics are used to make someone more attractive.

“Under U.S. law, cosmetic products and ingredients do not need FDA approval before they go on the market. The one exception is color additives (other than coloring materials used in coal-tar hair dyes), which must be approved for their intended use” (U.S. Food and Drugs). Therefore, since this product does not have any color additives, if we display this product as just a cosmetic, there would be no FDA guidelines that would restrict this product from the U.S. market. However, if other companies or FDA finds any safety concerns against the product, they “need reliable information showing that it is unsafe when consumers use it according to the directions in the labeling or in the customary or expected way” (U.S. Food and Drugs).

The Hangzhou Yunxi Biotechnology Company intended their product to also fall under the subcategory of a cosmetic as a lotion. However, with this product falling under this subcategory, new problems arise. Right now, the Hangzhou Yunxi Biotechnology Company is describing their lotion as “intending to affect the structure or function of the body, or for a therapeutic purpose, such as treating or preventing disease” (U.S. Food and Drugs). Therefore, this product also falls under the category of a drug and has to follow the FDA guidelines for a drug.

The FDA has provided lists of ingredients in drugs that are considered safe and ingredients that can be harmful. For a drug to be approved by the FDA, these steps must be taken: FDA reviewers analyze target conditions and available treatments, assess benefits and risks from clinical data (also uncertainties), and strategize for managing risks. After these steps are completed, the FDA will provide an FDA approved drug label and in some cases implement REMS—a Risk Management and Mitigation Strategy.

Before this product is transported throughout the U.S. and over state lines, the FDA requires that the product have an approved marketing application. However, if the Hangzhou Yunxi Biotechnology company wanted to ship their product to be checked by clinical investigators in other states, they need an exemption called an IND in which there are three main types.

“An investigator IND is submitted by a physician who both initiates and conducts an investigation and under whose immediate direction the investigational drug is administered or dispensed. An emergency IND allows FDA to authorize use of experimental drugs in an emergency situation that does not allow time for submission of an IND with some limitations. It is also used for patients who do not meet the criteria of an existing study protocol or if there is no approved study protocol. A treatment IND is submitted for experimental drugs showing promise in clinical testing for serious or immediately life-threatening conditions while the final clinical work is conducted” (U.S. Food and Drug Administration).

For an IND application, three steps must be taken. There must be animal pharmacology and toxicology studies, manufacturing information, and clinical protocols and investigator information. After a thirty-day waiting period, an approval is either given or not.

All drugs must also go through an approved NDA application before U.S. commercialization. The NDA application is where drug sponsors propose that the FDA

approves a new pharmaceutical for sale and marketing in the U.S. The NDA application includes both animals and human clinical trials. The goal of the NDA is to help the FDA reviewer come to a solution about the following questions: “whether the drug is safe and effective in its proposed uses, whether the benefits outweigh the risks, whether the drug’s proposed labeling is appropriate, whether the methods used in manufacturing and controls used to maintain the drug’s quality are adequate to preserve drug’s identity, strength, quality, and purity” (U.S. Food and Drug). The NDA application also requires the drug’s whole story: clinical trials and results, ingredients, how drug behaves in body, and how it is manufactured.

Yael Schwartz, the President and CEO of Or-Genix Therapeutics, told our group that these studies should be considered: FRANZ cell permeation study and UVA/UVB see Appendix G for interview notes.

The FRANZ cell permeation study is “a simple, reproducible test for measuring the in vitro drug release from creams, ointments, and gels” (Diffusion Cell Apparatus). The FRANZ cell permeation study occurs in a Vertical FRANZ Diffusion Cell, which “consists of two primary chambers separated by a membrane” (Diffusion Cell Apparatus). The drug is inserted into the membrane via the top chamber-donor compartment. The bottom compartment contains the fluid from which samples are taken at regular intervals for analysis. The study determines how much the cosmetic has permeated through the membrane through certain time points.

UV testing is another simple study that should be done. During this study, UV radiation is cycled through the cosmetic, and the UV Arc then “determines changes in

the cosmetic due to exposure” (UV and Xenon Weathering Testing). Yael Schwartz recommended two different UV studies using two different types of UV radiation, UVA and UVB. “UVA penetrates deep into [people’s] skin and damages [it]. UVA radiation causes almost all forms of skin aging, including wrinkles. UVA damages collagen and elastin in the skin and also generates free radicals. UVB radiation is very high energy but does not penetrate as deeply as UVA. UVB damages the top layers of the skin and can cause DNA mutations that can eventually lead to melanoma, other types of skin cancer, and cataracts” (MD Anderson Cancer Center). Both these forms of testing will show how the cosmetic reacts with UV rays from the sun.

4.2 Current Assessment of Stem Cell Market and SWOT Analysis

Throughout the research it became obvious that there is a large variety of stem cell products on the market. Many companies sell plant-derived stem cell products which may be more appealing to individuals worried about the ethical sourcing of their products. The companies in this industry that are not selling plant-derived stem cell cosmetics are offering human-derived stem cell products. We were not able to find any companies that offer animal-derived stem cell cosmetic products.

From our online research we found that the majority of companies that sell human-derived stem cell products focus on serums and aqueous solutions. There does not appear to be many creams or cleansers on the market. From the trends we noticed while looking at other companies we found that stem cells types used and how they use

them vary significantly. Some companies use stem cell growth factors to condition their media, while others use fibroblast conditioned media. One company uses the client's own stem cells, acquired through liposuction to condition the media in their customizable products.

Given the fine line that the companies (see Table 1) walk between selling a medical product and a cosmetic product, they are not entirely forthcoming with the stem cells they use and how they are acquired. Table 1 provides a list of the potential competitors, products, prices, technology, marketing strategies, and resources available to these companies, that Hangzhou Yunxi Biotechnology would face if they were to enter the US market:

Competitor name	Products	Price	Technology overview	Marketing strategy	Resources
Indie Lee	Stem cell serum	\$135/30ml	Plant stem cells	Good for antioxidants, the company has a direct to consumer marketing strategy. They focus significantly on their website and the consumer experience on said website.	https://www.figagency.com/work/how-indie-lee-changed-the-face-and-complexion-of-e-com-cosmetics
FACTORFIVE	Has a large variety of products, mostly serums	Varies	Human stem cell growth factors	Market themselves as "powered by human stem cells", advertise in magazines	https://factorfiveskin.com/about/
LifeLine Skin Care	Aqueous treatment, reduces redness	\$105/30ml	Human parthenogenetic stem cells	Claim to be the company that discovered new type of stem cell	https://lifelineskincare.com/pages/about-us
SkinMedica	TNS recovery complex -reduces wrinkles and fine lines	\$220 per bottle	Human fibroblast conditioned media	Sell through dermatologists	https://www.skinmedica.com/
The Leading Salons of The World	There is a variety	Varies	Uses customers stem cells, extracted through liposuction	Personalized skin care, advertised by beauty influencers	https://www.leadingsalons.com/
Image Skincare	Serum to reduce wrinkles	\$102/30ml	Plant cell extracts	Unknown	https://imageskincare.com/products/stem-cell-serum-with-vectorize-technology#

Table 1: Potential competition for Yunxi Biotechnology

After assessing the current market, we set out to assess Yunxi Biotechnology as a company in order to see how it fits in the market and what improvements can be

made. In order to accomplish this we conducted a SWOT analysis of the company. The following is the breakdown from table 2:

Strengths	Weaknesses	Opportunities	Threats
<ul style="list-style-type: none"> ● Strong in 1-on-1 marketing ● Professional lectures on the topic ● Perfected their stem-cell products for maximum effect ● Can help human skin achieve self regeneration and repair 	<ul style="list-style-type: none"> ● Low brand recognition ● Limited marketing methods: legally forbidden in china to advertise stem cell technology ● Lack of consumer knowledge of stem cells ● The product is slow acting which may lead to consumer doubts if they don't use it for long enough ● Until this point the market for this product has been high-end consumers, minimizing the field of potential consumers. 	<ul style="list-style-type: none"> ● The deepening awareness of stem cell technology ● To market to a lower-end consumers ● Expanding to the US ● Marketing to people with burns and other serious skin ailments 	<ul style="list-style-type: none"> ● The ethical questions and bad opinions of stem cell us ● The ethics of using animal products in skin care ● Being considered a medical product by the FDA

Table 2: SWOT analysis for Yunxi Biotechnology

4.3 Market research

When reviewing responses to questions one and two on the American survey, found in Appendix D, respondents seemed to have a pretty strong understanding of stem cells and their purpose. With a majority of responses coming back with a rating of level 3 or higher in terms of their understanding, and 57% of people having heard of stem cell beauty products.

It appears customers do have some concerns regarding stem cells, especially ethical concerns. Many responses to the free response question included concerns about the use of animals, how the animals were being treated, and how these animal products would affect the respondents. Based on these responses, a couple of recommendations can be made. The first recommendation is the company should be completely transparent with its consumers. It needs to have information available on its product, and that should be easily available to the user. Many respondents said they were far more likely to do quite a bit of research about the products they intended to use, meaning that if information is unavailable, they may be skeptical and more hesitant to purchase the product.

When asking respondents whether or not they would use a stem cell skin care product, whether that be the product they are currently using with stem cells added, or a different product that has heavily researched stem cells (questions xxx to xxxx). In both cases, respondents seemed open to trying stem cell products and seemed fairly

receptive to them. In this case, these would both be products they would feel absolutely comfortable with, as one is a product that they have used for a while, it just contains a new ingredient, and the other is a heavily researched product that has extensive information available to the consumer so they can ensure the product is safe. In both cases, this helps reinforce the point that the company needs to be transparent with its consumers. In addition, it shows that the American market is currently open to this technology and science when supplied with proper information and assurance, so this is something that is possible for the company to get into.

A majority of people spend 60 dollars and below on beauty products, with only 17% of people spending \$60-\$80 a month, and only 2% spending \$80-\$100. This means that if our company were to come to America, they should set their target price range to about 40-60 dollars.

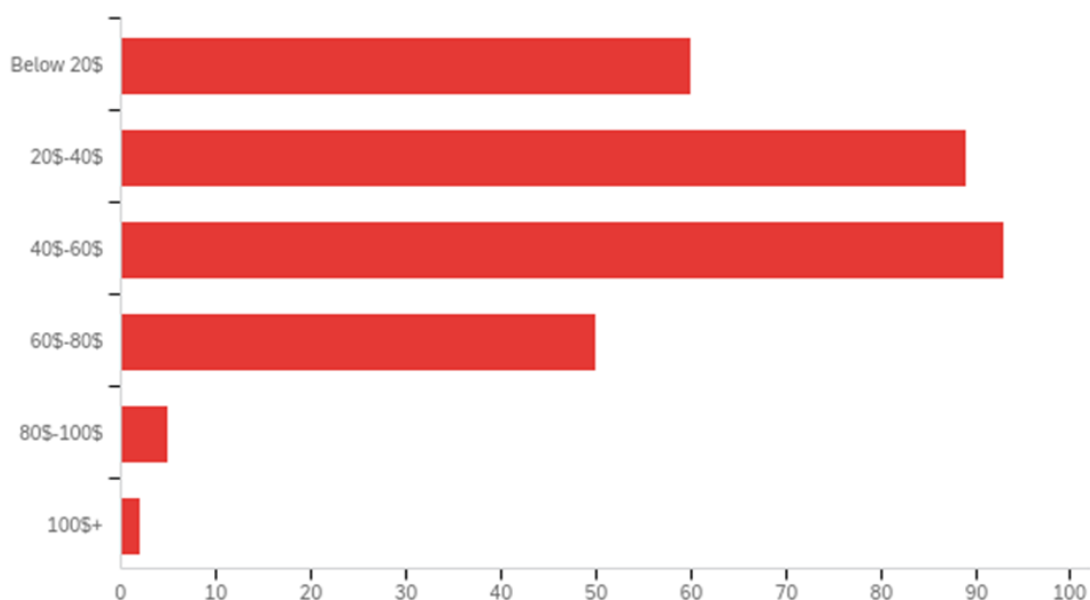


Figure 1: Average American consumer spending on cosmetics per month

When reviewing just the female responses, the average amount people spent did not change too much, but there was a higher concentration of spenders within the \$20 to \$60 range. When pricing their product, the company should consider the largest pool of consumers available to them. They should aim to reduce costs so they can afford to sell the product at this price to expand the number of consumers they have. If they are targeted at a smaller range, they have to be aware and market to their target consumer group.

When asking questions about marketing and how customers primarily heard of and found beauty products, people primarily hear about these products through advertisements, beauty salons, and dermatologists. Some of the weaker methods of advertising included hospital clinics and related lectures.

If the company were to move overseas to America, their primary forms should be marketing are advertisements and beauty salons. In terms of the female market, beauty salons are not as popular, and it is heard about more through related articles. This means that if the company is primarily targeting the same female market when they move overseas, they should look to have their product discussed in articles and have related companies and reporters push their product out onto the market.

Additionally, dermatologists are also more popular than salons, so the company should look to provide this information to local dermatologists in the locations in which they plan to sell their product. We would recommend the company look to advertise and promote through these methods.

Social media campaigns are also useful in order to solidify a potential customer's familiarity with the product. The product can be advertised through Instagram or Facebook to reach the largest number of consumers.

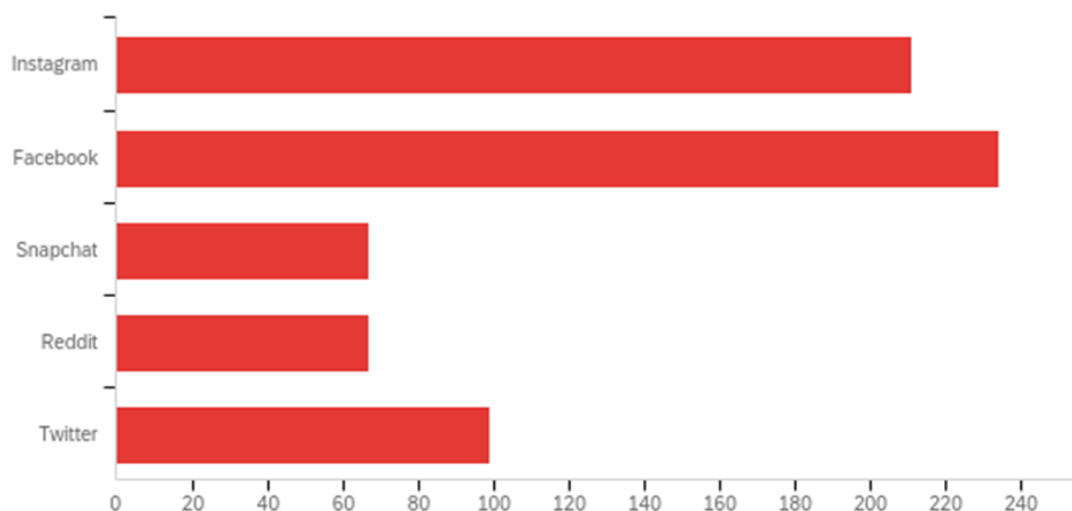


Figure 2: American consumers' main social media platform usage.

More survey responses can be found under the appendix E.

In the Chinese Survey results (see Appendix F for results), we targeted the market local to the company. One question was the understanding of stem cells within the Chinese market. Over 50% of responses stated that the respondent did not understand anything about stem cells, meaning the market may not fully understand the benefits of the product but may still be inclined to try it. Many customers may be willing to try it as they may be more receptive to it. Many people said they had never even heard of stem cell products before. The company would have to do some marketing, especially advertisement to get the product into the market.

In a question about marketing, many people said they preferred to learn about the beauty products from related articles and hospitals, meaning they most likely want information available about the product and its ingredients. Most people said they would wait to try the

product to see if it was effective or not, meaning that a strong release with large amounts of marketing done prior could help draw in more customers. Overall, the Chinese survey results had some slight differences from the United States survey, and the market seemed more willing to try the product.

4.4 Long Term Business models

Hangzhou Yunxi Biotechnology Company's best long term business model is to prepare themselves for acquisition from a US cosmetic corporation. Currently it is very hard for startups to break into the US cosmetic industry, especially due to the newest NPD study stating that the entire United States cosmetics industry shrank by 19%. When startups enter a shrinking field, the failure rate increases drastically. A new study done by CBS found the main reason startups fail is due to a lack of a market for their products or services. Also, when we interviewed the industry expert, Yael Schwartz, she agreed that in this market acquisition is best for this company. An acquisition is when a larger company buys all or majority shares to gain control of a smaller company.

Acquisition is good for startup owners because they get their shares sold at a premium and are given the option to keep their jobs at a company with more revenue. It is also best for the products because they will have more money behind them for marketing, legal issues, and any more research. However, if acquisition is not the way Yunxi Biotechnology wants to go, it is still a good idea to do the pre-acquisition actions because they will increase trust and marketability in the US.

Steps to prepare for acquisition for Yunxi include preparing products in a proper clean setting, ensuring the entire company from packaging to company size is as

streamlined as possible, and getting an audience with dermatologist boards. Again, these steps should be taken regardless if you want to be acquired or not just to be more marketable in the United States.

Where and how you make the products narrows down to two main focus points: being made in a good manufacturing process facility and ensuring that the base raw material is pure. A good manufacturing process certification is for ensuring products are produced consistently and are produced to a certain quality standard. This assures the international consumer community and acquiring corporations that the product they paid is the product they are receiving, no hazardous materials are in the solution, and every bottle of solution is the same.

Each country has their own set of good manufacturing practice (GMP) guidelines however the gold standard is the US Good Manufacturing Practice guidelines. Corporations will not even look at companies who don't follow the United States GMP because if a company does not have the certification they lack legitimacy. Good Manufacturing Practice can save companies money because it is more expensive to find mistakes in the manufacturing process later on than preventing them in the first place.

GMP is important to acquiring international corporations because in some countries to even get the product within the borders the seller needs the GMP certification. In order to solve this problem, there are two options: either find a factory in China that has GMP certification or preferably make the current facilities GMP certified. In order to start to make your facility GMP certified, an authorized person within the

company has to fill out an application through the FDA. Then the facility has to be audited by a FDA member to see if your facility fulfills all the requirements of GMP certification. After the GMP certification is acquired for a manufacturing plant, it lasts for three years.

Startups are notorious for being cash-starved, so choosing where money goes is important. According to our interview with Yael Schwartz, the first thing that corporations look at when wanting to acquire a company is the packaging of the product, so it is important to spend marketing money there first. This is because when the average person buys products, as we found from our research, they do not always do research before buying a product, meaning the only thing convincing people to buy your product is your packaging.

The next streamlining action that Yunxi should take should be to streamline the actual company by three steps. The first would be to reduce small debts by adopting a pay now, not later motto because this will reduce chances of late fees and small interest rates. The second would be to stay on schedule because this would help everyone stay on track and show a face of unity to any possible acquiring corporations. Lastly, trying to create a vertical monopoly will help decrease money spent between stages of the manufacturing process.

The last main pre-acquiring action Hangzhou Yunxi should take is gaining approval from dermatology boards. Dermatology approval is important to an acquiring company because it helps prove that the product is safe. This is also important to consumers as it gives legitimacy to the product and makes it seem safe. We would see

costs and dependencies on other companies. A vertical monopoly is when a company owns the ability to produce everything from the raw products that would be used to make products to the final products. This reduces costs because there are no middle men taking their cut. Streamlining is so important to the Acquiring corporations because even if a bad company is streamlined, it can have a facade of being in recommendation seeking recommendations specifically from the American Academy of Dermatology because it is the largest and most notable dermatology board in the world.

We asked in our interview with Yael Schwartz how to do this, and we were told that Yunxi would need to hire a United States marketing team. Marketing teams would have the proper connections within Dermatology boards and get a foot in the door so the board will review their products. In conclusion, hiring a marketing team would go a long way by helping Yunxi receive a dermatology board approval which would greatly help chances of being acquired and having legitimacy in the United States.

5 Conclusions & Recommendations

Yunxi Biotechnology, a small cosmetics start-up in Hangzhou China, requested that we recommend a business model and marketing strategies for the company to expand, based on research surrounding the company. More specifically, we were asked to answer three main questions. Firstly, we set out to understand which government regulations a stem cell skin care company would need to adhere to if operating in the US. Second, we were asked to analyze the market reactions in the US and in China to stem cell based cosmetics, and lastly analyze the state of stem cell technology in the US and the ethics involved in this field. After analyzing all our findings on these different topics we were able to create a potential business model and additional recommendations to the company.

In order to find and understand the laws that Yunxi Biotechnology would need to adhere to in the US, we conducted research on FDA laws as well as meeting with Yael Schwartz, a professional in the industry. Our main finding was that if cosmetics companies refrain from using medical language on their products, they can avoid regulation altogether. There is no governing body that regulates cosmetics. The only time the government gets involved is when there are medical claims being made about a product. We recommend that Yunxi Biotechnology puts together a board of professionals to ensure that the wording on all the products avoids language that will lead to government attention. We also recommend that Yunxi Biotechnology invest in an

INCI label (ingredients label), which is standard practice, and once again keeps the FDA from investigating the company.

Lastly, we recommend that the company goes through some of the more basic cosmetic testing programs, such as UV testing. This testing will also make the product more appealing for potential dermatologists who are considering selling Yunxi Biotechnology's products.

Using surveys sent out to potential consumers in the US and in China, we found that both countries' consumers are receptive to the idea of stem cell cosmetics. That being said, there were some concerns about animal cruelty that would need to be addressed by the company if they were to sell their products in the US.

We also recommend that Yunxi Biotechnology focuses on selling their products through dermatologist offices and other reputable locations. The majority of potential US consumers are only somewhat aware of how stem cells work and would feel more confident in the product if it was dermatologist approved. Although these surveys were beneficial for understanding what the average consumer is willing to spend money on, Yunxi Biotechnology currently only offers products to upscale clientele, worth thousands of dollars a month.

The potential customers we surveyed are willing to spend \$20-\$80 dollars a month on cosmetics. If Yunxi Biotechnology were to expand to the US, they may want to consider starting a more affordable product line. Additionally, the product could be advertised through Facebook and Instagram which is where the majority of potential consumers participate in social media.

We also conducted research into the high end stem cell companies that do not disclose the specifics of their products, most likely to avoid government regulation. This makes it difficult to gain a clear understanding of the state of the competition. In the findings section you can find a table that breaks down the competition and their marketing strategies.

Our final major recommendation for Yunxi Biotechnology is that they expand to the US and prepare their company for acquisition. The majority of cosmetic companies create a successful product line and then either sell the company or the individual product line to a larger more well-known company. This is simply how the cosmetics industry in the US functions. This is also a good way to ensure profit from a product.

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Appendix A: Survey to American Consumers

Page 1 (Introduction):

This survey is a component of an interdisciplinary qualifying project at Worcester Polytechnic Institute. The goal of this survey is to analyze consumer response to stem cell-based cosmetics. No prior knowledge of this topic is required for the completion of the survey. Yunxi Biotechnology, a cosmetics start-up in Hangzhou China, is sponsoring the project in the hopes to glean information on the US market reaction to their products. These results will be confidential and this study has been approved by the research board of WPI.

Thank you for taking the time to complete this 5-minute survey!

Page 2 (The Survey Questions):

- 1. How much do you know about stem cells? (1) not at all, (5) understand the function and purpose.**
- 2. Do you know about stem cell beauty products?**
 - a. Never heard of any.**
 - b. I have heard about stem cell beauty products but have not used them.**
 - c. I have heard about stem cell beauty products and have used one currently or in the past.**

3. Do you have any reservations about trying a new product based on new research?
If yes, what?
4. Do you understand how stem cell cosmetics work? If so, can you explain how?
5. How often do you use skin care products?
 - a. Apply three times a day
 - b. Apply once a day
 - c. Apply every other day
 - d. Apply once a week
 - e. Apply less than once a week
6. If you have the opportunity, how willing would you be to try stem cell beauty products? Willing to try (5) and unwilling to (1).
7. What reservations would you have with using stem cell based products?
8. Would you still use your current skin care product if it contained stem cells?
 - a. yes
 - b. no
9. Do you have ethical issues with animal stem cells being used in a product? Don't care (1) and major issue (5).
10. What issues do you have with animal stem cells being used in cosmetic products?
11. How much do you spend on beauty products on average every month?
 - a. \$20-40
 - b. \$40-60
 - c. \$60-80
 - d. \$80-100
 - e. \$100+

12. How much would you be willing to pay for scientifically researched stem cell beauty products?

- a. <\$10
- b. \$10-50
- c. \$50-100
- d. \$100-200
- e. \$200+

13. What are some after sale amenities you would expect?

14. Through which channel do you currently learn about cosmetic products?

- a. Advertisements
- b. Hospital clinic
- c. Beauty salon
- d. Related lecture
- e. Related article
- f. Dermatologist
- g. other

15. Which channel would you most likely buy stem cell beauty products from?

- a. Market
- b. Exclusive shop
- c. Online shop
- d. Hospital clinic
- e. beauty salon
- f. Social media
- g. Dermatologist

- h. Other**
- 16. How much do you research skin care products before buying them?**
- 17. What do you look for in a skin care product?**
- 18. What are your main social media platforms? (multiple choice)**
- a. Instagram**
 - b. Facebook**
 - c. Snapchat**
 - d. Reddit**
 - e. Twitter**
- 19. What do you identify as?**
- a. Man**
 - b. Woman**
 - c. Other**
- 20. What is your age?**
- 21. What is your highest level of education?**
- a. Primary level**
 - b. Middle school**
 - c. High school**
 - d. College**
 - e. Undergraduate**
 - f. Graduate**
 - g. Doctorate**
-

Appendix B: First Survey to Chinese Consumers

Page 1 (The Survey Questions):

Consumer Acceptance of Advanced Stem Cell Beauty Technology

Question 1. Are you a man or a woman?

- a. Man
- b. Woman

Question 2. What age group are you in?

- a. 13-20 years old
- b. 21-30 years old
- c. 31-40 years old
- d. 41-50 years old
- e. 51-60 years old
- f. Over 60 years old

Question 3: What is your education level?

- a. Primary School Level
- b. Junior High School Level
- c. High School Level
- d. Junior College Level

- e. Undergraduate Level
- f. Postgraduate Level
- g. Doctor Level

Question 4: What is your consumption level? (What is your personal consumption level of beauty products?)

- a. Tall (Large)
- b. Middle (Medium)
- c. Low (Small)

Question 5. How much do you spend on beauty products on average every month?

- a. Below 1K
- b. 1K-2K
- c. 2K-3K
- d. Over 3K

Question 6. How much do you know about stem cells?

- a. Know nothing about stem cells.
- b. Have some knowledge of stem cells.
- c. Know a lot about stem cell function.

Question 7. Do you know (about) stem cell beauty products?

- a. Never heard of it.

- b. I have learned about stem cell beauty products from other ways, but I have never used them.
- c. Know that it is currently in use.

Question 8. Which channel do you prefer to learn about stem cell beauty products?

- a. Advertisement
- b. Hospital Project
- c. Beauty Salon Product
- d. Related Lectures
- e. Related Articles
- f. Other

Question 9. Do you think stem cell beauty products are reliable?

- a. I don't know, so I don't know if it's reliable.
- b. Not reliable; think that the disadvantages outweigh the advantages
- c. Reliable; think that the advantages outweigh the disadvantages

Question 10: Are you willing to use stem cell beauty products?

- a. I think this kind of products do more harm than good, and are unwilling to use them.
- b. I think this kind of product is very good, and I am very willing to use it.
- c. Not sure whether the product is easy to use; have to wait and see.

Question 11. The reason why you don't want to use stem cell beauty products may be?

- a. Too slow to take effect
- b. Worried about the side effects of stem cell beauty products
- c. The price is too expensive
- d. Think stem cell beauty products have no effect
- e. Do not know the specific effect of the product

Question 12. If you have the chance, would you like to try stem cell beauty products?

- a. Willing to try
- b. Worried about side effects; unwilling
- c. Simply unwilling to try

Question 13. Which channel would you like to buy stem cell beauty products from?

- a. Market
- b. Speciality Stores
- c. Online Shopping
- d. Hospital Clinic
- e. Beauty Salon
- f. Other

Question 14. What is your psychological expectation for the consumption price of stem cell beauty products?

- a. Under 1w / year
- b. 1w-5w / year
- c. 5w-10w / year

- d. 10w - 15w / year
- e. 15w-20w / year

Question 15. What kind of after-sales service do you want?

- a. Product Feedback
 - b. Beauty Lecture
 - c. Letter Return Visit
 - d. Sales Campaign
 - e. Other
-

Appendix C: Second Survey to Chinese Consumers

Page 1 (The Survey Questions):

Questionnaire on the Use of Skin Care Products by Adults

Question 1. What is your gender?

- a. Male
- b. Female

Question 2. What age group are you currently in?

- a. 18-35 years old
- b. 36-45 years old
- c. 46-60 years old
- d. Over 60 years old

Question 3. What is your education level?

- a. Primary School Education or Below
- b. Junior High School Education
- c. High School Education
- d. Junior College Degree
- e. University Degree
- f. Graduate Degree or Above

Question 4. Do you currently have any skin care needs?

- a. Yes
- b. No

Question 5. What are your current skin care needs?

- a. Moisture
- b. Scar Removal
- c. Light Spot
- d. Acne Treatment
- e. Skin Whitening
- f. Anti Fading
- g. Allergic Muscle Soothing Repair
- h. Other

Question 6. Are you currently using skin care products or services?

- a. Yes
- b. No

Question 7. What is your average monthly consumption of skin care?

- a. Below 500 yuan
- b. 500-1000 yuan
- c. 1000-2000 yuan
- d. 2000-3000 yuan

- e. 3000-5000 yuan
- f. 5000-8000 yuan
- g. 8000-10000 yuan
- h. More than 10000 yuan

Question 8. How often do you currently use skin care products or services?

- a. Daily Use
- b. Use once every two to three days
- c. Use once a week
- d. The frequency of use is not fixed. You can only use it when you think of it.

Description of Yunxi Company Products:

At present, Yunxi company has six high-tech skin care products.

- **No. 0-1 products: low concentration**
 - Basic 6 pieces / box
 - 980-3000 yuan / box
 - Concentration of stem cells is relatively low, but this one can reach the most high-end skin care products.
 - The main efficacy is to moisturize, keep skin moist and shiny, and improve skin elasticity.
 - Use it once every morning and evening after cleaning the skin.
 - One month is a course of treatment.
- **Product No. 2-4: high concentration**
 - 6 Sticks / boxes

- **7200-8400 yuan / box**
- **Stem cells have relatively strong concentration. According to different types of products, they have specific functions, including wrinkle wrinkles, whitening and skin rejuvenating essence.**
- **Shrink pores, fade fine lines of anti aging essence**
- **For acne potion, allergic dermatitis repairs essence**
- **The specific use frequency and service cycle of the product shall depend on the specific situation.**
- **Product No. 5: skin introduction type**
 - **1.5ml/piece**
 - **5800 yuan / piece**
 - **Skin introduction is required. It will be better to import directly from the skin for further application.**
 - **The main efficacy is to promote the rapid growth and repair of epidermal cells, reduce scar formation, improve and repair old scars and stretch marks.**
 - **Improve scalp tissue metabolism and reduce scalp oil secretion.**
 - **Use it 2-3 times a day, and the service cycle depends on the specific situation.**

Question 9. Which product do you think can meet your current skin care needs?

- a. **0-1 Product No.**
- b. **2-4 Product No.**
- c. **5 Product No.**

Question 10. If such products can solve the above skin problems, would you like to understand and try it?

- a. Willing to understand and try**
- b. Willing to understand, but hesitant to try**
- c. Willing to understand, but unwilling to try for the time being**
- d. Temporarily unwilling to understand and try**
- e. I don't need to know; willing to try it directly**

Question 11. Why are you hesitant or unwilling to understand / try?

- a. Worried about prices exceeding expectations**
- b. The product is not well known and dare not to try**
- c. Long life cycle; the effect will not be immediate**
- d. Other**

Question 12. For your applicable product (0-5), what is your average monthly consumption budget for this product?

- a. Below 1000 yuan**
- b. 1000-2000 yuan**
- c. 2000-3000 yuan**
- d. 3000-6000 yuan**
- e. 6000-10000 yuan**

Question 13. If you know that the product works well through personal experience or other channels, would you like to share it with your family and friends?

- a. Willing**
- b. Unwilling**
- c. Needs to consider**

Question 14. Why are you unwilling or hesitant to share this product with your family and friends?

- a. The price exceeded expectations**
- b. The product is not well known and dare not to try**
- c. Long life cycle; the effect will not be immediate**
- d. Other**

Question 15. For your applicable product (0-5), what is your average monthly consumption budget for this product?

- a. Below 1000 yuan**
- b. 1000-2000 yuan**
- c. 2000-3000 yuan**
- d. 3000-6000 yuan**
- e. 6000-10000 yuan**

Question 16. Where do you want to buy this product?

- a. Exclusive Shop**
- b. Online Shopping**

- c. Medical Clinic
- d. Beauty Salon
- e. Indifferent
- f. Other

Question 17. What services would you like this product to provide?

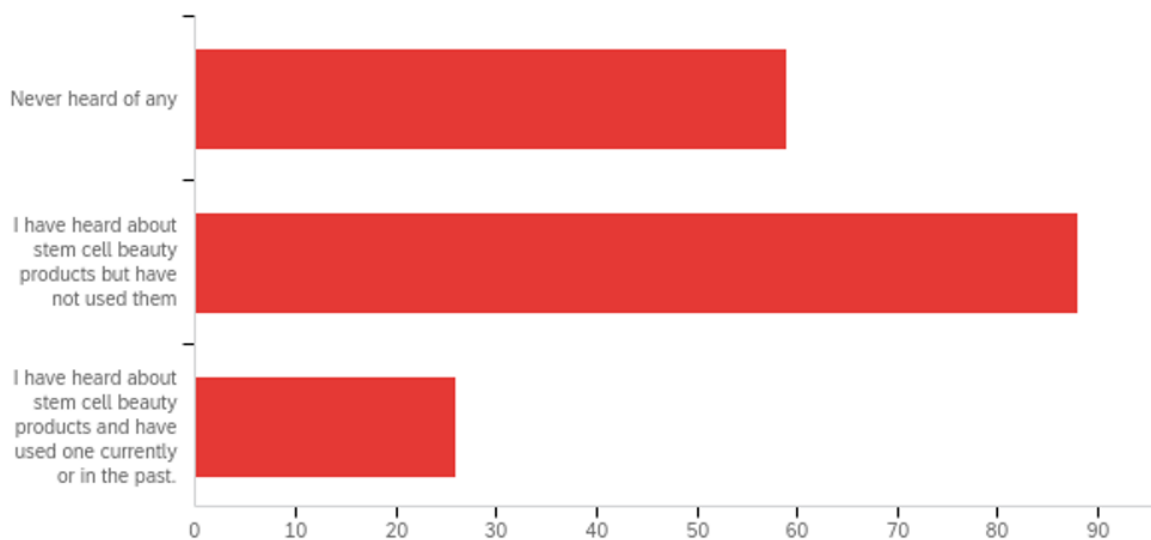
- a. Trial Service
 - b. Door-to-door service
 - c. Use tracking: professionals follow up and master your skin care cycle in real time
 - d. Other
-

Appendix D: Results from American Survey

Question 1 Responses:

Field	Minimum	Maximum	Mean	Standard Deviation	Variance	Count
(1) not at all, (5) understand the function and purpose	1.00	5.00	2.77	1.18	1.40	171

Question 2 Responses:



Field	Minimum	Maximum	Mean	Standard Deviation	Variance	Count
Do you know about stem cell beauty products?	1.00	5.00	3.13	1.57	2.46	173

Options	Answer	Percentage	Count
1	Never heard of any	34.10%	59
2	I have heard about stem cell beauty products but have not used them.	50.87%	88
3	I have heard about stem cell beauty products and have used one currently or in the past.	15.03%	26
	Total	100%	173

Question 3 Responses:

Responses	Number of Responses
Yes	23
No	153
Scared to Try	1
Reservations due to insufficient testing and unforeseen side effects (wait to hear if safe and reliable)	13
Long Term Effects?	3
Origins and Ethics?	3
Does it Work?	4
Not Enough Time in Market	3
Sliminess?	1
Procuration?	1
Allergic Reaction Causer (Rashes)?	2
In product?	5
Moral?	3

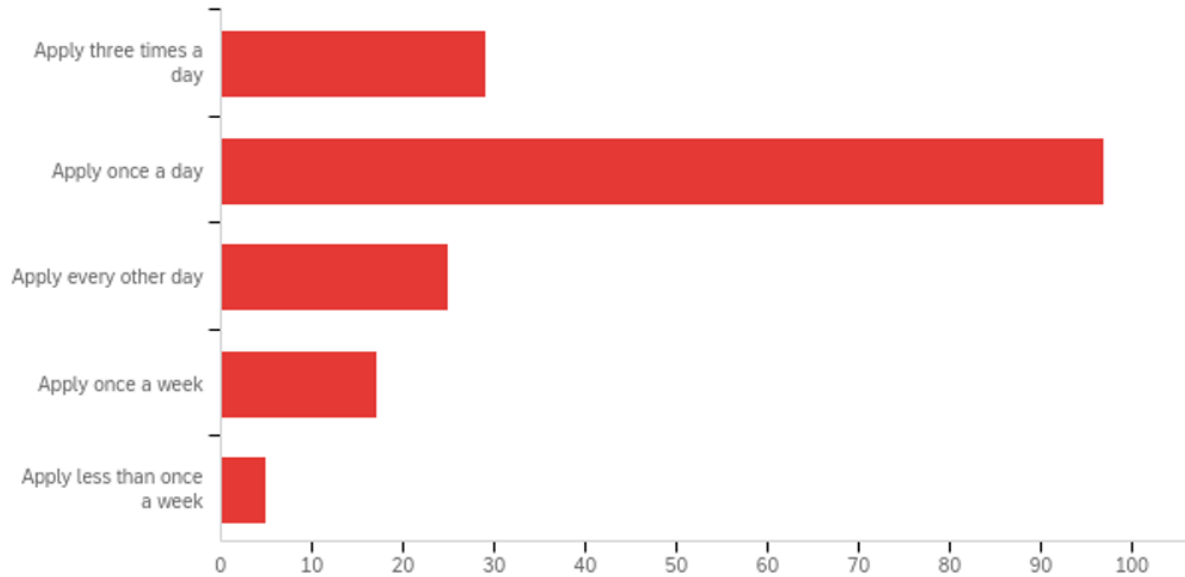
Animal Testing Passed?	1
Extraction (and with religion)?	2
Affordable?	1
Risks and Benefits	5
Knowledge of Product	2
Research	4
Total	230

Question 4 Responses:

Responses	Number of Responses
Yes	22
No	110
Recreation of New Cells + Cell Growth	21
The truth is that stem cells in skin care products do not work as claimed	1
In fact, almost all cosmetic companies advertising to contain stem cells in their products actually contain stem cell extracts and not the live stem cells. Although research on plant stem cells used in skin care reveals their potential as skin protectives, antiaging and antiwrinkle products	9
Something to do with surgery	2
Repair skin	3
Rejuvenate skin	12
The truth is that stem cells in skin care products do not work as claimed	6
They are responsible for constant renewal (regeneration) of your skin, and for healing wounds. So far, scientists have identified	3

several different types of skin stem cell: Epidermal stem cells are responsible for everyday regeneration of the different layers of the epidermis.	
Dermatologists are now turning to stem cells to fight wrinkles and improve skin turnover and overall appearance.	2
Cells are processed and re-injected into your face.	3
Cosmetic products based on the main ingredients are obtained through human stem cell culture, and can be defined as having the effect of recovering skin health, skin regeneration, and delaying aging of skin cells.	1
Stem cells naturally have antioxidant properties and they nourish skin cells which promotes cell turnover and increases collagen production. This could result in fewer lines and wrinkles, improved skin texture and tone, and younger, better-looking skin.	4
Come from embryos and other human bodies	4
To stimulate epidermal cells to thicken the skin	1
These stem cells are manipulated to specialize into specific types of cells, such as heart muscle cells, blood cells or nerve cells. The specialized cells can then be implanted into a person.	1
The stem cells in skin care products do not work as claimed. they have not formed into a cell with a specific function yet	1
Stem cells helps to clear the black spots on skins and gives a good blowing colour	1

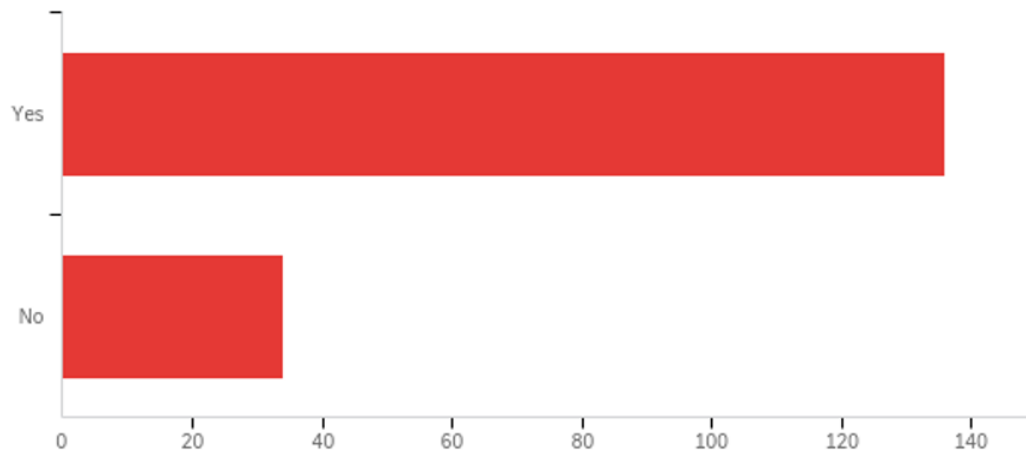
Also called tissue specific or somatic stem cells, adult stem cells exist throughout the body from the time an embryo develops	1
Stem cells in skin care products do work as claimed	1
Reverse aging process	4
Promotes cell turnover and increases collagen production.	2
What these products contain is plant stem cells and more commonly chemicals that have been derived from plant cells.	2
This is whereby fat is harvested and transferred into the facial area to help the face tissues to grow into fats.	3
Safety	1
Change genetics in pores	1
They function as a part of a repair system that replenishes cells throughout your life, they are found from the bone marrow from my understanding	1
I would assume stem cells are incorporated in beauty products so that they will be absorbed by the skin and possibly rejuvenate the skin from within, but I don't know if that is even close.	1
Researchers grow stem cells in a lab. These stem cells are manipulated to specialize into specific types of cells, such as heart muscle cells, blood cells or nerve cells. The specialized cells can then be implanted into a person.	1
Total	225

Question 5 Responses:

Field	Minimum	Maximum	Mean	Standard Deviation	Variance	Count
How often do you use skin care products?	1.00	7.00	3.92	1.52	2.30	173

Options	Answer	Percentage	Count
1	Apply three times a day	16.76%	29
2	Apply once a day	56.07%	97
3	Apply every other day	14.45%	25
4	Apply once a week	9.83%	17
5	Apply less than once a week	2.89%	5
	Total	100%	173

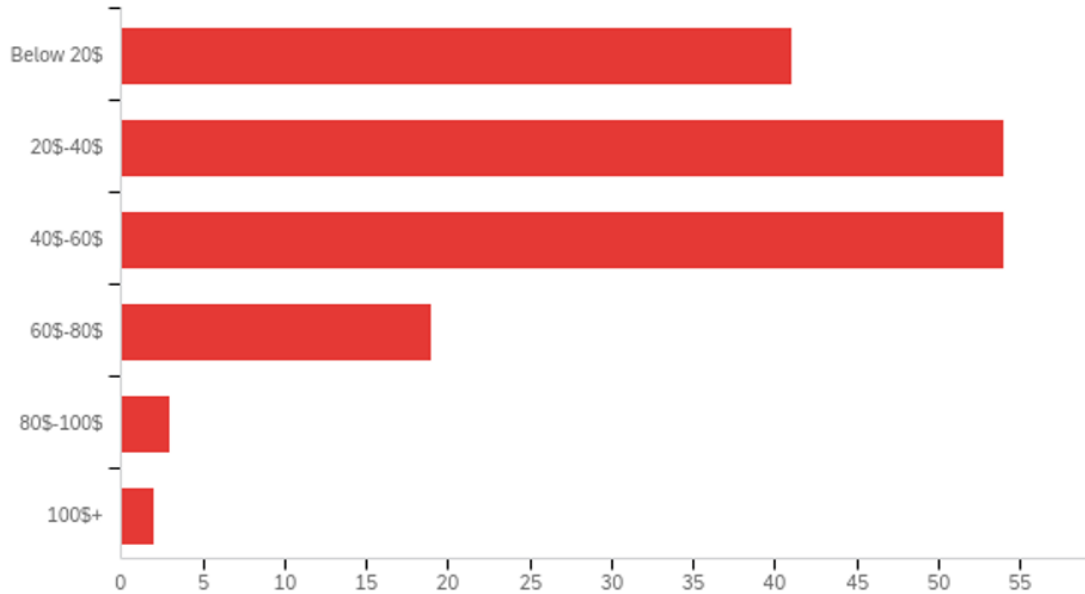
Question 6 Responses:



Field	Minimum	Maximum	Mean	Standard Deviation	Variance	Count
Would you still use your current skin care product if it contained stem cells?	1.00	2.00	1.20	0.40	0.16	170

Options	Answer	Percentage	Count
1	Yes	80.00%	136
2	No	20.00%	34
	Total	100%	170

Question 7 Responses:



Field	Minimum	Maximum	Mean	Standard Deviation	Variance	Count
How much do you spend on beauty products on average every month?	1.00	8.00	3.92	1.79	3.22	173

Options	Answer	Percentage	Count
1	Below \$20	23.70%	41
2	\$20-\$40	31.21%	54
3	\$40-\$60	31.21%	54
4	\$60-\$80	10.98%	19
5	\$80-\$100	1.73%	3
6	\$100+	1.16%	2
	Total	100%	173

Question 8 Responses:

Options	Answer	Minimum	Maximum	Mean	Standard Deviation	Variance	Count
1	Advertisement	1.00	5.00	3.43	0.94	0.89	173
2	Hospital Clinic	1.00	5.00	2.37	1.36	1.84	169
3	Beauty Salon	1.00	5.00	2.79	1.40	1.95	170
4	Related Lectures	1.00	5.00	2.37	1.33	1.78	166
5	Related Articles	1.00	5.00	3.05	1.15	1.32	169
6	Dermatologist	1.00	5.00	2.85	1.35	1.83	169
7	Other	1.00	5.00	2.23	1.46	2.15	132

Other Responses	Number of Responses
Youtube Influencers	6
Social Media	12
Friends	7
None	6
Family	3
Beauty Stores	1
Amazon	1
Reviews	1
Store	1
Research	1
Celebrities	1

Online	2
Risk	1
Wholesale	1
Total	44

Question 9 Responses:

Field	Minimum	Maximum	Mean	Standard Deviation	Variance	Count
Willing to try (5) and unwilling to (1)	1.00	5.00	3.42	1.17	1.38	173

Question 10 Responses:

Options	Answer	Minimum	Maximum	Mean	Standard Deviation	Variance	Count
1	Market	1.00	5.00	2.88	1.27	1.61	170
2	Exclusive Shop	1.00	5.00	3.03	1.19	1.41	169
3	Online Shopping	1.00	5.00	3.46	1.21	1.48	171
4	Hospital Clinic	1.00	5.00	2.69	1.34	1.80	168
5	Beauty Salon	1.00	5.00	2.75	1.31	1.71	168
6	Social Media	1.00	5.00	2.70	1.41	1.99	165
7	Dermatologist	1.00	5.00	3.26	1.26	1.59	169
8	Other	1.00	5.00	1.98	1.38	1.91	121

Other Responses	Number of Responses
------------------------	----------------------------

Pharmacy	1
Friends	2
None	5
Shop	1
Social Media	1
Beauty Stores	1
Drugstore	1
Market	1
Expo	1
Parlour	1
Total	15

Question 11 Responses:

Field	Minimum	Maximum	Mean	Standard Deviation	Variance	Count
(1) Not at all (5) completely	1.00	5.00	3.60	0.98	0.95	166

Question 12 Responses:

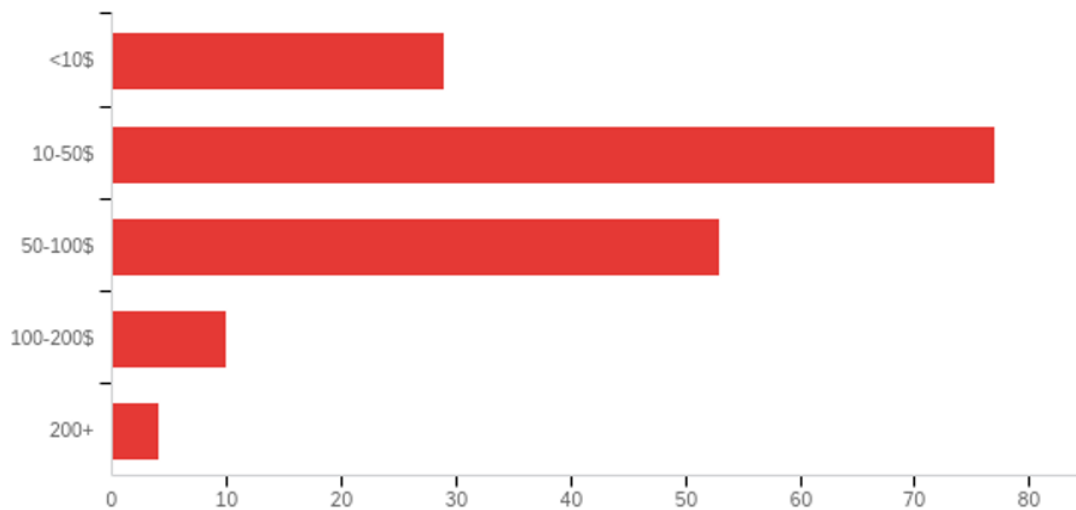
Field	Minimum	Maximum	Mean	Standard Deviation	Variance	Count
Don't care (1) and major issue (5)	1.00	5.00	2.80	1.28	1.64	171

Question 13 Responses:

Responses	Number of Responses
-----------	---------------------

No	43
Yes	9
Allergies & other side effects	31
Ethics of using embryos	11
Ethics of using animals	43
Good	7
Unsure	1
Don't want animal products on their skin	4
Worried about improper testing and advertising	4
Product only being available to the wealthy	1
Cancer	4
Misc.	40
Total	198

Question 14 Responses:



Field	Minimum	Maximum	Mean	Standard Deviation	Variance	Count
How much would you be willing to pay for scientifically researched stem cell beauty products?	1.00	7.00	3.99	1.50	2.25	173

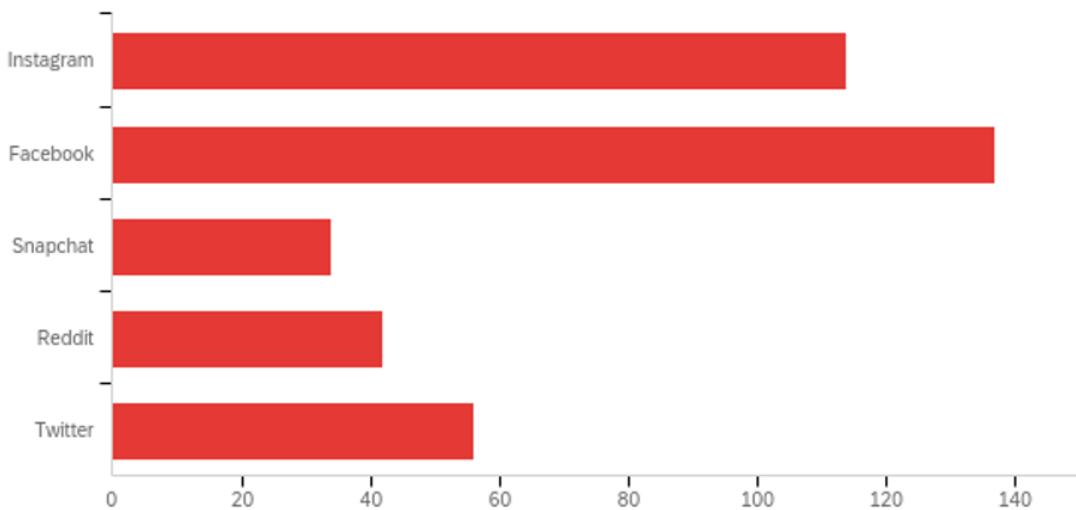
Options	Answer	Percentage	Count
1	<\$10	16.76%	29
2	\$10-\$50	44.51%	77
3	\$50-\$100	30.64%	53
4	\$100-\$200	5.78%	10
5	\$200+	2.31%	4
	Total	100%	173

Question 15 Responses:

Responses	Number of Responses
No	4
Yes	3
None	18
Free samples	8
Expect a website with information	1
Something to apply products with	1
I don't know	12

Deals on future products	16
Improved skin	22
Easy to reach customer service	1
Available refund	4
Customer follow up	8
Nice packaging	2
Free trial	4
Misc.	80
Total	184

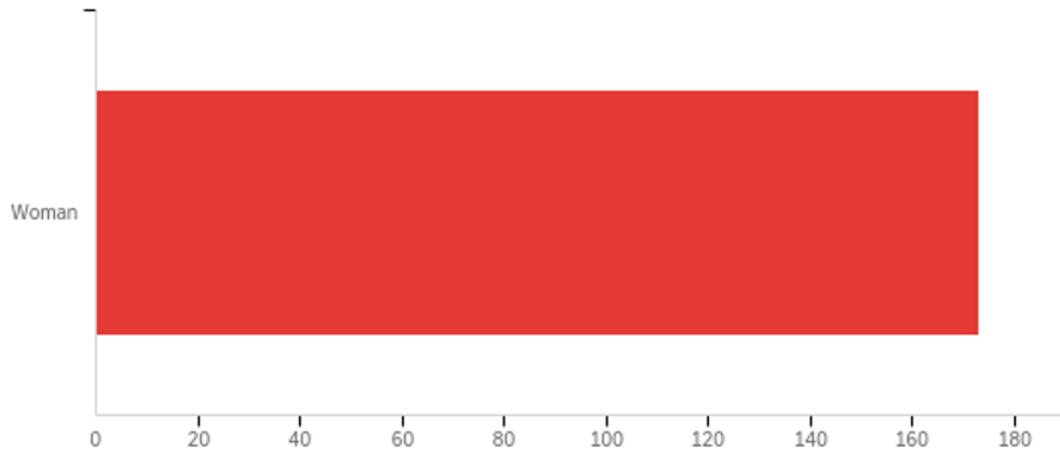
Question 16 Responses:



Options	Answer	Percentage	Count
1	Instagram	29.77%	114
2	Facebook	35.77%	137
3	Snapchat	8.88%	34
4	Reddit	10.97%	42

5	Twitter	14.62%	56
	Total	100%	383

Question 17 Responses:

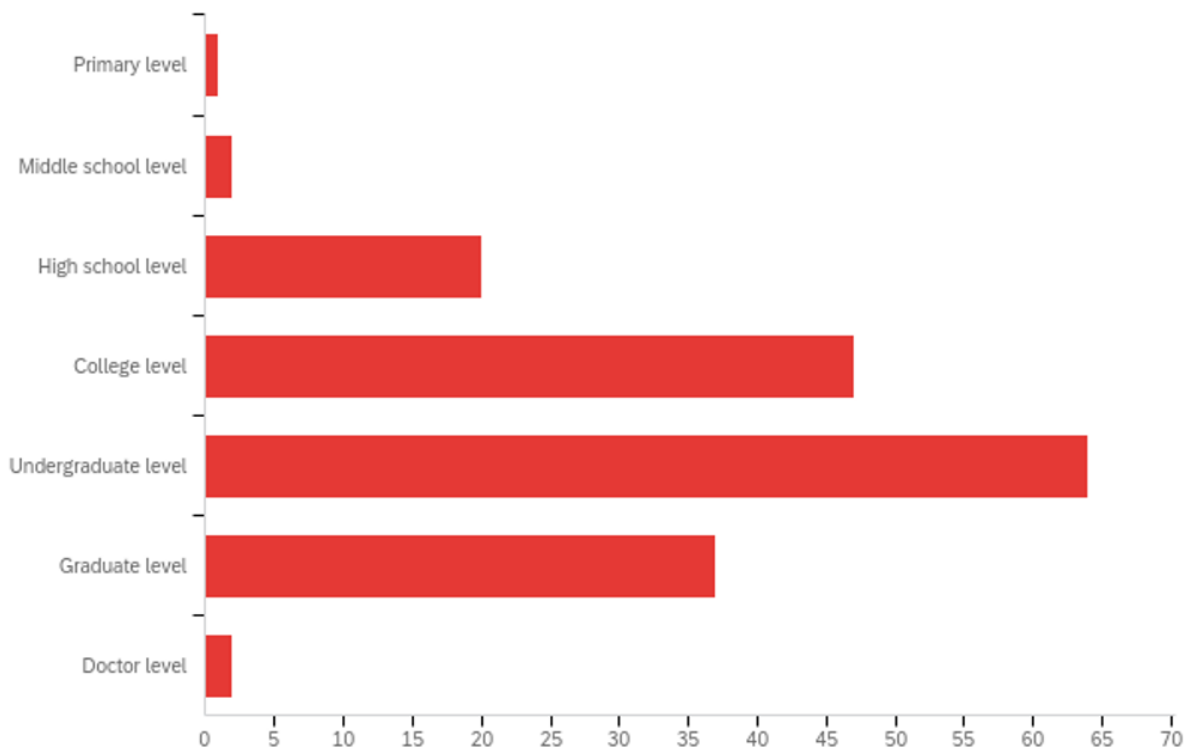


Field	Minimum	Maximum	Mean	Standard Deviation	Variance	Count
What do you identify as?	4.00	4.00	4.00	0.00	0.00	173

Question 18 Responses:

Field	Minimum	Maximum	Mean	Standard Deviation	Variance	Count
What is your age?	21.00	71.00	39.99	12.44	154.85	172

Question 19 Responses:



Field	Minimum	Maximum	Mean	Standard Deviation	Variance	Count
What is your highest education level?	1.00	9.00	6.66	1.09	1.19	173

Options	Answer	Percentage	Count
1	Primary Level	0.58%	1
2	Middle School Level	1.16%	2
4	High School Level	11.56%	20
5	College Level	27.17%	47
6	Undergraduate Level	36.99%	64
7	Graduate Level	21.39%	37

8	Doctor Level	1.16%	2
	Total	100%	173

Question 20 Responses:

Responses	Number of Responses
Stem cells manipulated and growing into other specific types of cells	5
Side effects/Allergies	13
Technology	1
Safety	11
Effectiveness/Reliability	4
Skin Care	4
Testing and Transparency	6
Extraction	13
None	16
Ethics	6
No Long Term Data	4
Hurts Animals/Plants	3
Genetic Deficits in Cells	1
Difference from other non stem cell products	1
Being a Stem Cell Product	2
Think of Cancer Treatment	1
Price/Availability and Ingredients	8
Risks and Benefits	1
Vanity	1
How does it work?	3

Knowledge of Stem Cells	2
Total	106

Question 21 Responses:

Responses	Number of Responses
Moisturizing/Lactic Acid Containing	26
Hypoallergenic	6
Ingredients = pure/natural	33
Value for purchase	31
Effectiveness	25
Safety	9
Dermatologist approved/medical grade	6
Smell	4
Brand	7
Positive Reviews	11
Compatibility	2
Lightweight; not oily	1
Provides results	15
Soothing	1
Hyaluronic acid	1
Wrinkle prevention	4
Brighteners	1
Non comedogenic	2
Treats acne	5
Anti-aging	8
Shining	1

Firmness	2
Smoothness	2
Cruelty Free	6
Non irritating	1
Easy to apply	3
Hydration	3
Softener	1
Pore cleanser	1
Sun protection	6
Sensitivity	2
Rejuvenation	1
Consistency	1
Reliability	2
Texture	3
Long-lasting	1
No side effects	5
Shea butter	10
Fast acting	1
Exfoliants	2
Retinoids	2
Vitamins	2
Total	256

Appendix E: Results from Chinese Survey #1

Question 1:

Option	Subtotal	Proportion
Man	38	21.84%
Woman	136	78.16%
Number of Valid Fill-In Times for This Question	174	

Question 2:

Option	Subtotal	Proportion
13-20 years old	62	35.63%
21-30 years old	38	21.84%
31-40 years old	16	9.2%
41-50 years old	51	29.31%
51-60 years old	5	2.87%
Over 60 years old	2	1.15%
Number of Valid Fill-In Times for This Question	174	

Question 3:

Option	Subtotal	Proportion
Primary School Level	2	1.15%
Junior High School Level	23	13.22%
High School Level	23	13.22%
Junior College Level	21	12.07%

Undergraduate Level	103	59.2%
Postgraduate Level	1	0.57%
Doctor Level	1	0.57%
Number of Valid Fill-In Times for This Question	174	

Question 4:

Option	Subtotal	Proportion
Tall	7	4.02%
Middle	101	58.05%
Low	66	37.93%
Number of Valid Fill-Ins for This Question	174	

Question 5:

Option	Subtotal	Proportion
Below 1K	147	84.48%
1K-2K	13	7.47%
2K-3K	5	2.87%
Over 3K	9	5.17%
Number of Valid Fill-In Times for This Question	174	

Question 6:

Option	Subtotal	Proportion
Know nothing about stem cells.	89	51.15%

Have some knowledge of stem cells.	78	44.83%
Know a lot about stem cell function.	7	4.02%
Number of Valid Fill-In Times for This Question	174	

Question 7:

Option	Subtotal	Proportion
Never heard of it	109	62.64%
I have learned about stem cell beauty products from other ways, but I have never used them.	59	33.91%
Know that it is currently in use.	6	3.45%
Number of Valid Fill-In Times for This Question	174	

Question 8:

Option	Subtotal	Proportion
Advertisement	22	12.64%
Hospital Project	54	31.03%
Beauty Salon Project	8	4.6%
Related Lectures	17	9.77%
Other	21	12.07%
Related Articles	52	29.89%
Number of Valid Fill-In Times for This Question	174	

Question 9:

Option	Subtotal	Proportion
I don't know, so I don't know if it's reliable.	140	80.46%
Not reliable; think that the disadvantages outweigh the advantages.	14	8.05%
Reliable; think that the advantages outweigh the disadvantages	20	11.49%
Number of Valid Fill-In Times for This Question	174	

Question 10:

Option	Subtotal	Proportion
Think this kind of products do more harm than good, and are unwilling to use them.	21	12.07%
I think this kind of product is very good and I am very willing to use it.	21	12.07%
Not sure whether the product is easy to use, wait and see.	132	75.86%
Number of Valid Fill-In Times for This Question	174	

Question 11:

Option	Subtotal	Proportion
Too slow to take effect	17	11.11%
Worried about the side	73	47.71%

effects of stem cell beauty products		
The price is too expensive	70	45.75%
Think stem cell beauty products have no effect.	36	23.53%
Do not know the specific effect of the product.	112	73.2%
Number of Valid Fill-In Times for This Question	153	

Question 12:

Option	Subtotal	Proportion
Willing to try	89	51.15%
Worried about side effects; unwilling	58	33.33%
Simply unwilling to try	27	15.52%
Number of Valid Fill-In Times for This Question	174	

Question 13:

Option	Subtotal	Proportion
Market	7	33.33%
Speciality Stores	10	47.62%
Online Shopping	4	19.05%
Hospital Clinic	11	52.38%
Beauty Salon	10	47.62%
Other	2	9.52%

Number of Valid Fill-In Times for This Question	21	
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Question 14:

Option	Subtotal	Proportion
Under 1w / year	139	79.89%
1w-5w / year	25	14.37%
5w-10w / year	4	2.3%
10w-15w / year	1	0.57%
15w-20w / year	5	2.87%
Number of Valid Fill-In Times for This Question	174	

Question 15:

Option	Subtotal	Proportion
Product Feedback	91	52.3%
Beauty Lecture	18	10.34%
Letter Return Visit	16	9.2%
Sales Campaign	17	9.77%
Other	32	18.39%
Number of Valid Fill-In Times for This Question	174	

Appendix F: Results from Chinese Survey #2

Question 1:

Option	Subtotal	Proportion
Male	59	29.8%
Female	139	70.2%
Valid Amount of People's Answers to Question	198	

Question 2:

Option	Subtotal	Proportion
18-35 years old	117	59.09%
36-45 years old	44	22.22%
46-60 years old	33	16.67%
Over 60 years old	4	2.02%
Valid Amount of People's Answers to Question	198	

Question 3:

Option	Subtotal	Proportion
Primary School Education and Below	5	2.53%
Junior High School Education	3	1.52%
High School Education	21	10.61%

Junior College Degree	18	9.09%
University Degree	148	74.75%
Graduate Degree or Above	3	1.52%
Valid Amount of People's Answers to Question	198	

Question 4:

Option	Subtotal	Proportion
Yes	145	73.23%
No	53	26.77%
Valid Amount of People's Answers to Question	198	

Question 5:

Option	Subtotal	Proportion
Moisture	129	88.97%
Scar Removal	24	16.55%
Light Spot	70	48.28%
Acne Treatment	59	40.69%
Skin Whitening	71	48.97%
Anti-Fading	75	51.72%
Allergic Muscle Soothing Repair	37	25.52%
Other	4	2.76%
Valid Amount of People's Answers to Question	145	

Question 6:

Option	Subtotal	Proportion
Yes	119	82.07%
No	26	17.93%
Valid Amount of People's Answers to Question	145	

Question 7:

Option	Subtotal	Proportion
Below 500 yuan	58	48.74%
500-1000 yuan	45	37.82%
1000-2000 yuan	7	5.88%
2000-3000 yuan	5	4.2%
3000-5000 yuan	0	0%
5000-8000 yuan	1	0.84%
8000-10000 yuan	2	1.68%
More than 10000 yuan	1	0.84%
Valid Amount of People's Answers to Question	119	

Question 8:

Option	Subtotal	Proportion
Daily Use	83	69.75%
Use once every 2 to 3 days	18	15.13%

Use once a week	7	5.88%
The frequency of use is not fixed. You can only use it when you think of it.	11	9.24%
Valid Amount of People's Answers to Question	119	

Question 9:

Option	Subtotal	Proportion
0-1 Product No.	81	55.86%
2-4 Product No.	53	36.55%
5 Product No.	11	7.59%
Valid Amount of People's Answers to Question	145	

Question 10:

Option	Subtotal	Proportion
Willing to understand and try	53	36.55%
Willing to understand, but hesitant to try	37	25.52%
Willing to understand, but unwilling to try for the time being	32	22.07%
Temporarily unwilling to understand and try	23	15.86%
I don't need to know; willing to try it directly	0	0%
Valid Amount of People's Answers to Question	145	

Question 11:

Option	Subtotal	Proportion
Worried about prices exceeding expectations	58	63.04%
The product is not well known and dare not try	63	68.48%
Long Life cycle, but the effect will not be immediate.	29	31.52%
Other	10	10.87%
Valid Amount of People's Answers to Question	92	

Question 12:

Option	Subtotal	Proportion
1000 yuan and below	123	84.83%
1000-2000 yuan	16	11.03%
2000-3000 yuan	5	3.45%
3000-6000 yuan	0	0%
6000-10000 yuan	1	0.69%
Valid Amount of People's Answers to Question	145	

Question 13:

Option	Subtotal	Proportion
Be willing	126	63.64%
Unwilling	17	8.59%
Need to consider	55	27.78%

Valid Amount of People's Answers to Question	198	
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Question 14:

Option	Subtotal	Proportion
The price exceeded expectations.	36	50%
The product is not well known and dare not try.	41	56.94%
Long life cycle, but the effect will not be immediate	25	34.72%
Other	11	15.28%
Valid Amount of People's Answers to Question	72	

Question 15:

Option	Subtotal	Proportion
1000 yuan and below	30	83.33%
1000-2000 yuan	5	13.89%
2000-3000 yuan	0	0%
3000-6000 yuan	0	0%
6000-10000 yuan	1	2.78%
Valid Amount of People's Answers to Question	36	

Question 16:

Option	Subtotal	Proportion
Exclusive Shop	94	74.6%

Online Shopping	59	46.83%
Medical Clinic	32	25.4%
Beauty Salon	14	11.11%
Indifferent	12	9.52%
Other	4	3.17%
Valid Amount of People's Answers to Question	126	

Question 17:

Option	Subtotal	Proportion
Trial Service	109	86.51%
Door-to-door service	27	21.43%
Use tracking: professionals follow up and master your skin care cycle in real time	69	54.76%
Other	6	4.76%
Valid Amount of People's Answers to Question	126	

Appendix G: Notes from Interview with Yael Schwartz

Cosmetic/Cosmeceutical - Game of Wordsmanship:

- Get an advisory board within United States that has done this before
- FDA will look for medical claim on their websites, which is how they bop people
 - Change “cures of acne” to “lessens the appearance of blemishes”
- Careful how they word things, acne (medical) vs blemish (nonmedical)
- Stem cell companies walked the line between medical and nonmedical
- INCI Name - A name for their product that includes ingredients and such
 - International Nomenclature Cosmetic Ingredients
 - Cost \$250 US dollars

Research done before:

- China regulations very different than United States regulations
- Grafts ingredients
- Not gonna do anything in vivo, too expensive
 - In vitro could do skin irritation
 - FRANS = cell permeation study
 - UVA and UVB
 - Studies cost under \$4000
- Make 80%-90% profit off of how much product is put into vial

Advice Based on Experience:

- Minimal safety studies
- Partnered with bigger firm to get FDA trial without FDA in = several hundred thousand dollars
- Stem cell = HERO ingredient
- Trouble selling stem cells as HERO ingredient
 - Claim similarity between pig skin to human skin than any other animal
- Cosmetic life cycle
 - See new product goes up and then comes down
 - As product peaks, need to plan for next product extension
 - Need to keep innovating
- The cleaner the package, the nicer it looks, and the more people will gravitate towards it

- Jacked up price = getting something extra special
- Started out with dermatologists and then to amazon and online shops
- Advertising and want to get into beauty journals with backing of dermatologists
 - Expensive clinical trial needed
- Europe = largest consumer group for cosmopseudoical
 - Hard to break through because of registration of product

Stem Cells:

- All Kinds of Stem Cells are in use
- Can cost lot of money for development and research, but can pay off
 - One of her companies sunk several hundred thousand into development and it paid off
- People are looking for a differentiated product based off science
 - Many products now contain stem cells, alpha hydroxiacids, and rhetinoids work well
 - Every other ingredient is a carry on
 - Usually something novel thats patent protected selling stem cells as hero ingredient
- Branding
 - Market is very fickle
 - Cosmetic lifecycle- when a new product comes out and ends up in a CVS, goes up when people are excited then goes down, then goes down
 - Have to keep innovating
 - People are attracted to packaging
 - Cleaner, Nicer Looking packaging, more likely to be attracted to put their hand on that product
 - Started out at dermatologist office
 - Moved to amazon or online sites
- Advertising
 - Cosmetic Journals
 - Dermatologist Recommended
 - Requires expensive clinical trial
 - This will help to get into cosmetic journals which will increase growth
- Markets
 - Europe has most cosmetic sales (40%ish)
 - Growth in Europe is good but slow
 - US Market is also slow except in anti aging
 - Know what market your targeting

- Baby Boomers are a good example, lots of people and most have good money

GET A GOOD ADVISORY BOARD (Method):

- Chinese Market was very slow to adopt cosmeceutical market
- Everything they do should be under good manufacturing practice (GMP)
- Make sure raw material is pure, used to be impure
- Now a lot of clean material, also monitored by FDA
- They should try and market in china using us methods
- Ask them whats their endgame
- Aim for an acquisition
- Companies look at other companies for everything
- Acquirers will look you head to toe (packaging, filling, manufacturing)
- They will look at literally everything
- Gotta be a good seller to get acquired
- Trademark brand
- Skin assessment study
- Claim as cosmopseudical = do not need FDA approval for ingredients
- Market in China based on scrupulous US FDA manufacturing